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09/911,963	07/23/2001	James B. Terry	1391-10210	7967

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EXAMINER

LEE, JONG SUK

ART UNIT

PAPER NUMBER

3673

DATE MAILED: 05/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/911,963

Applicant(s)

TERRY ET AL.

Examiner

Jong-Suk (Jam s) Lee

Art Unit

3673

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3, 10-13, 15, 17-25, 33-35, 38-62 and 64-74 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-35, 38-47, 64-67 and 71 is/are allowed.
- 6) ☒ Claim(s) 1-3, 10-13, 15, 17-25, 48-62, 68-70 and 72-74 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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**DETAILED ACTION**

1. The amendment filed March 19, 2003 has been entered.

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***Specification***

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: "a modulus which does not vary along the length of the composite tube" in claim 1, lines 4-5; claim 10, line 2; claim 25, lines 2-3; and claim 68, lines 2-3 does not have clear antecedent basis for the terminology in the specification.

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***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21 This application currently names joint inventors. In considering patentability of the claims  
22 under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was  
23 commonly owned at the time any inventions covered therein were made absent any evidence to

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the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 10, 12, 13, 15, 17-19, 21, 23-25, 48-52, 57, 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horstmeyer et al. (US 4,463,814) in view of Thomeer et al.'003 (US 5,828,003).

Horstmeyer et al. disclose a down-hole drilling apparatus comprising: a composite tube (14) which is a tube/string of tubular members having a portion (32) made of non-metal/plastic, data transmission conductor/control wires (24), instrumentation wires (26), power cables (28) and abrasion-proof coverings (34); a drill bit/ a member of displacing formation (36); a power section/electric motor (60); a bottom hole assembly (21) attached downhole to the string including a well apparatus and a propulsion system/thrusters, pistons and housings (39, 52; 104; 106, 130); The direction of drilling can be altered by the operation of thruster assemblies (39, 52) serving as a three dimensional steering apparatus (see Figs. 1-14; col.3, lines 51-68; col.4, lines 1-68; col.5, lines 1-15; col.7, lines 2-14; col.8, lines 7-56; col.11, lines 24-33).

However, Horstmeyer et al. fails to disclose or fairly suggest the fibers wrapped in a predetermined pattern around the liner of the composite tube. Thomeer et al.'003 discloses a composite coiled tubing comprising of a liner (76, 91, 99) with a flowbore and layers of fibers (77-79, 92-95, 101-109) wrapped in a predetermined braided pattern around the liner (76, 91,

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1 99), a number of power conductors (105, 107) as depicted in Fig. 6e and/or a conductor or fiber  
2 may be intrinsically manufactured in the composite coiled tubing (see col.11, lines 12-34 and  
3 col.12, lines 43-58) and the layers of fibers may carry axial/tensile loads to the composite tubing;  
4 wherein a downhole assembly/tool (20) being connected to the composite tubing (see Figs. 1-29;  
5 col.6, lines 4-33; col.7, lines 12-67).

6 Therefore, it would have been obvious to one of ordinary skill in the art at the time the  
7 invention was made to replace Horstmeyer et al.'s composite tube with the composite tubing as  
8 taught by Thomeer et al.'003 in order to enhance the axial/tensile resistance for the composite  
9 tubing.

10 With respect to the modulus does not vary along the length of the composite tube, the  
11 fiber weaving orientation may provide the different modulus so one of ordinary skill in the art  
12 would have woven the fiber of the Thomeer'003's composite tubing in order to provide constant  
13 modulus along the length of the tube by varying the weaving orientation if desired.

14  
15 5. Claims 17, 19, 20, 55, 56, 68-70 and 72-74 are rejected under 35 U.S.C. 103(a) as being  
16 unpatentable over Pringle et al.'951 (US 5,394,951) in view of Thomeer et al.'003. The teachings  
17 of Thomeer et al.'003 have been discussed above.

18 Pringle et al.'951 disclose a bottom hole drilling assembly connectable to coiled tubing  
19 comprising: a string (20) of composite pipe attached at one end to the bottom hole drilling

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1 assembly and having a communication link extending through a wall of the pipe; a downhole  
2 motor (30); and a propulsion system attached to the downhole to the drill string further  
3 comprising of a drill bit (26), a drill stem attached to a drill bit at one end for drilling the bore hole  
4 and attached to an orientation assembly (48), a thruster/prime mover (40) coupled to the pipe  
5 string; an articulated joints/sub (32) articulable three dimensionally and having a first portion  
6 (32B) and a second portion (32A) in a manner to permit the second portion to be bent from a  
7 coaxial orientation from the first portion (32B), a steerable assembly (34, 36) in engagement with  
8 the second portion (32A) and the steerable assembly being in communication with the  
9 communication link to bend the articulated joints as to the command of direction change and an  
10 orientation assembly sending signals through the data transmission conduit/communication link  
11 (20) to control (56, 58) and the steerable assembly, prime mover receiving signals from the  
12 control to move the drill bit within the borehole in response to the signals, the propulsion system  
13 being powered by the circulation fluids circulated through the flow bore and up an annulus formed  
14 by the composite tubes and inherently the composite tubes being engineered to withstand axial  
15 and yield stress placed on the string (see Fig. 1; col.2, lines 53-68; col. 3, lines 1-59; col.5, lines  
16 10-43).

17         However, Pringle et al.'951 fails to disclose or fairly suggest the fibers wrapped in a  
18 predetermined pattern around the liner of the composite tube. Thomeer et al.'003 discloses a  
19 composite coiled tubing comprising of a liner (76, 91, 99) with a flowbore and layers of fibers

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(77-79, 92-95, 101-109) wrapped in a predetermined braided pattern around the liner (76, 91, 99), a number of power conductors (105, 107) as depicted in Fig. 6e and/or a conductor or fiber may be intrinsically manufactured in the composite coiled tubing (see col.11, lines 12-34 and col.12, lines 43-58) and the layers of fibers may carry axial/tensile loads to the composite tubing; wherein a downhole assembly/tool (20) being connected to the composite tubing as discussed above.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Pringle et al.'951's composite tube with the composite tubing as taught by Thomeer et al.'003 in order to enhance the axial/tensile resistance for the composite tubing.

With respect to the range of the modulus of elasticity, yield strain, yield stress of the composite tubing and the pulling force on the string by means of the propulsion system, an artisan within the ordinary skill in the art would have provided such a range as claimed in order to enhance the directional drilling capability and control.

With respect to the modulus does not vary along the length of the composite tube, the fiber weaving orientation may provide the different modulus so one of ordinary skill in the art would have woven the fiber of the Thomeer'003's composite tubing in order to provide constant modulus along the length of the tube by varying the weaving orientation if desired.

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1        6.        Claims 3, 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over  
2        Horstmeyer et al. as modified by Thomeer et al.'003, as applied to claim 1, further in view of  
3        Williams et al. (US 5,913,337). The teachings of Horstmeyer et al. modified by Thomeer et  
4        al.'003 have been discussed above.

5                However, the teachings of Horstmeyer et al. modified by Thomeer et al.'003 fail to  
6        disclose the range of Young's modulus and density of the composite umbilical and a metallic  
7        conductor embedded in a wall of the composite umbilical. Williams et al.'337 disclose a spoolable  
8        composite tubular member with energy conductors comprising of a composite umbilical including  
9        non-metallic/fibers having a modulus of elasticity which is 100,000 psi or greater, and including  
10       the metallic conductor (21) embedded in the wall of the composite umbilical (see Fig.11; col.3,  
11       lines 4-10; col.4, lines 25-34; col.12, lines 46-60).

12               Therefore, it would have been obvious to one of ordinary skill in the art at the time the  
13       invention was made to further modify the composite tube of Horstmeyer et al., as modified by  
14       Thomeer et al.'003, by replacing with the composite umbilical tube having a metallic conductor  
15       and a desired modulus of elasticity as taught by Williams et al.'337 in order to enhance stiffness of  
16       the composite umbilical by providing a uni-directional longitudinal stiffening material in the  
17       opposite sidewalls of the composite umbilical and still provide a desired elasticity limit.

18               With respect to the density parameters for the composite umbilical, it would have been  
19       obvious to one of ordinary skill in the art at the time the invention was made to have provided

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1 Horstmeyer et al.'s tube modified by Thomeer et al.'003 with a certain density in order to provide  
2 a tube that is light and easy to handle in spooling the composite umbilical.  
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4 7. Claims 22, 59 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over  
5 Horstmeyer et al. as modified by Thomeer et al.'003, as applied to claim 21, further in view of  
6 Colin et al.'145. The teachings of Horstmeyer et al. modified by Thomeer et al.'003 have been  
7 discussed above.

8 However, the teachings of Horstmeyer et al. modified by Thomeer et al.'003 fail to  
9 disclose a connector for connecting lengths of the pipe and a seal engaging upon the mating of the  
10 cooperative surfaces to provide hydraulic seal around the power conductor.

11 Colin et al.'145 disclose a connection device for a cable incorporating optical fibers and  
12 metal conductors including the connector assembly having seals (40, 43) between the connector  
13 body and outer shroud and retaining member complete the sealing of the connection device (see  
14 Figs.1-3; col.2, lines 1-35).

15 Therefore, in view of Colin et al.'145, it would have been obvious to one of ordinary skill  
16 in the art at the time the invention was made to further modify the composite tube of Horstmeyer  
17 et al., as modified by Thomeer et al.'003 by adding the connector device with seals between the  
18 end of the composite umbilical in order to efficiently provide the required length of the umbilical  
19 composite at the site.

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1        8.        Claims 53 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over  
2        Horstmeyer et al. as modified by Thomeer et al.'003, as applied to claim 17 and 21 respectively,  
3        further in view of Wu (US 5,438,267). The teachings of Horstmeyer et al. modified by Thomeer  
4        et al.'003 have been discussed above.

5                However, the teachings of Horstmeyer et al. modified by Thomeer et al.'003 fails to  
6        disclose a resistivity antenna being connected to the electronic section of the bottom hole  
7        assembly. Wu discloses a bottom hole assembly including a processor/electronic section (51)  
8        having an resistivity antenna as receivers (22, 26) to measure the resistivity of the well (see Fig. 1;  
9        col. 5, lines 21-68; col.6, lines 1-20; col.8, lines 1-19).

10              Therefore, in view of Wu, it would have been obvious to one of ordinary skill in the art at  
11        the time the invention was made to further modify the bottom hole assembly of Horstmeyer et al.,  
12        as modified by Thomeer et al.'003 by adding the receiver and processor to the system in order to  
13        enhance the control of the bottom hole assembly.

14

15        9.        Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pringle et al.'951  
16        as modified by Thomeer et al.'003, as applied to claim 17, and further in view of Dismukes (US  
17        4,646,856). The teachings of Pringle et al.'951 modified by Thomeer et al.'003 have been  
18        discussed above.

19              However, The teachings of Pringle et al.'951 modified by Thomeer et al.'003 fails to

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1 disclose or fairly suggest the string of tubular members engineered to cause the string to achieve  
2 neutral buoyancy in the fluids of the well and the specific density of the umbilical composites.  
3 Dismukes discloses tubulars for directional drilling comprising of drill string/conduit, the conduit  
4 including the cylinder designed to provide flotation to the conduit to cause it to be neutrally  
5 buoyant in drilling fluid of the well (see Figs. 7-10; col.5, lines 30-56).

6 Therefore, in view of Dismuke, it would have been obvious to one of ordinary skill in the  
7 art at the time the invention was made to further modify the composite tube of the Pringle et  
8 al.'951, as modified by Thomeer et al.'003, by including the cylinder in order to provide  
9 substantial neutral buoyancy to the umbilical in the drilling fluids.

10  
11 ***Response to Arguments***

12 10. Applicant's arguments with respect to the combination of Horstmeyer et al. and Thomeer  
13 et al.'003 reference such that the Thomeer'003's composite coiled tubing is connected to a  
14 downhole tool which may be used to conduct flow of measurements or perhaps to provide  
15 diverting fluid and is not designed for Horstmeyer's drilling assembly and Thomeer'003 does not  
16 teach embedding an electrical conductor in the wall of the composite coiled tubing for providing  
17 electrical power downhole, is not persuasive because downhole or bottomhole assembly may be  
18 used as conducting flow or measurement or may include the propulsion/drilling assembly with  
19 utilizing fluid flow to empower the propulsion or drilling assembly within the ordinary skill in the

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1 art. Further, the composite coiled tubing can be used as an umbilical which transfer the electrical  
2 power through the conductors for either electronic data processing or electrical power providing  
3 to any devices requiring the electricity, such as electrical downhole motor insofar as the tubing  
4 include the conductors.

5 With respect to the modulus not varying along the length of the composite tube which is  
6 different from the Thomeer'003 reference, it is not persuasive because the coiled tubing of  
7 Thomeer'003 may also not be varied along the length of the tubing depending upon the  
8 geographic layout in the desired formation insofar as the borehole is directed simple and straight  
9 without bending the tube. Further, the fiber weaving orientation may provide the different  
10 modulus so one of ordinary skill in the art would have woven the fiber of the Thomeer'003's  
11 composite tubing in order to provide constant modulus along the length of the tube by varying the  
12 weaving orientation if desired.

13 With respect to the applied tension loads to the umbilical are different for both references  
14 such that tension load on the fluid conveying tubing of Thomeer'003 by means of its own weight  
15 and the tension load on the drill string for Horstmeyer which is designed to withstand tension  
16 loads caused by the pulling the propulsion system, it is more limited than the claim scope.

17  
18 11. Applicant's arguments with respect to the combination of Pringle et al.'951 reference and  
19 Thomeer et al.'003 reference such that the Pringle et al.'951's metal coiled tubing drill string is

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1 different from Thomeer'003's fluid conveying coiled tubing, is not persuasive because the metal  
2 coiled tubing of Pringle et al.'951 would have been replaced with the enhanced and sophisticated  
3 composite umbilical coiled tubing of Thomeer et al.'003 insofar as the both coiled tubing provides  
4 the fluid and electrical/electronic power to the downhole assembly. Pringle et al.'951 was meant  
5 to be viewed in combination with Thomeer'003 and neither was meant to be viewed individually.

6 With respect that Thomeer'003's coiled tubing is not designed for use with a  
7 propulsion/thruster system which pulls the tubing into well, it can be considered to be an umbilical  
8 with reinforced with the fibers for either pushing or pulling so as to be used in either flow  
9 conveying and electrical power providing to the downhole assembly, or to bottomhole assembly  
10 with propulsion/thruster insofar as the Thomeer'003's coiled tubing may be used as "umbilical" to  
11 the down/bottomhole assembly.

12  
13 ***Allowable Subject Matter***

14 12. Claims 33-35, 38-47, 64-67 and 71 would be allowable over the prior art of record.  
15

16 ***Conclusion***

17 13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office  
18 action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is  
19 reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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1 A shortened statutory period for reply to this final action is set to expire THREE  
2 MONTHS from the mailing date of this action. In the event a first reply is filed within TWO  
3 MONTHS of the mailing date of this final action and the advisory action is not mailed until after  
4 the end of the THREE-MONTH shortened statutory period, then the shortened statutory period  
5 will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR  
6 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however,  
7 will the statutory period for reply expire later than SIX MONTHS from the date of this final  
8 action.

9 14. Any inquiry concerning this communication or earlier communications from the examiner  
10 should be directed to Jong-Suk (James) Lee whose telephone number is (703) 308-6777. The  
11 examiner can normally be reached between the hours of 6:30AM to 3:00PM Monday thru Friday.  
12 If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor,  
13 Heather C. Shackelford, can be reached on (703) 308-2978. The fax phone number for this  
14 Group is (703) 305-3597.

15 Any inquiry of a general nature or relating to the status of this application or proceeding  
16 should be directed to the Group receptionist whose telephone number is (703) 308-2168.

17 J. Lee /jjl  
18 May 2, 2003  
19  
20  
21

  
**Jong-Suk (James) Lee**  
**Primary Examiner**  
**Art Unit 3673**